Toll Fraud Guard Installation Manual v1.1

Toll Fraud Guard Version 1.2.4

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Revision History

Version	Author	Date	Updates
1.0	**R Horsley**	**April 2015**	**Initial release of Toll Fraud Application 1.1.7**
1.1	**R Horsley**	**July 2015**	**Version 1.2.4 – Add SSL/TLS Support**

What is Toll Fraud?

Toll Fraud is a term used to describe the occurrence un-authorised calls on a PBX. Switch misuse can of course originate in-house, for example private calls initiated by an employee, or forwarding of a DDI to an extension and then on to an external destination. However, the rise in Dial Through Fraud (DTF) and VoIP security threats reported recently shows us that the worst misuse is likely to be generated remotely by hackers who exploit any available remote access to the customers PBX to generate expensive unauthorised calls.

It is important to note that any customer thus affected is still liable for all such call charges and these can sometimes run can extremely expensive.

DTF can be perpetrated via a number of access methods, examples include IP-PBX systems reprogrammed remotely, SIP Trunks, SIP Extensions, DISA (Direct Inward Service Access) or Voicemail.

The hacker has the aim of obtaining access codes and passwords/PINs that will enable unauthorised calls to be made via a customer's switch. Often, the hackers then sell on these details to an organised fraudster for profit.

Toll Fraud Guard

The Toll Fraud Guard is an active call monitoring application that can be used to help prevent toll fraud from happening. It works by monitoring SMDR output provided by the PBX and applies user configured rules to look for call trends that could be deemed fraudulent. When potential fraudulent activity takes place the guard can send email notifications to users informing them of the suspicion. As the application runs on the PBX it has the ability to prevent further fraudulent activity from taking place by modifying its configuration. If the same extension is making a high number of calls then it can be moved to a restricted toll restriction class to prevent it from making further calls. Likewise if the Guard sees many outbound calls to the same number, if can block this number from being dialled.

There are two stages to the blocking actions for outbound calls, the alerts are first set to warn the user about the possible fraudulent activity. Secondly an automatic blocking action can be carried out, this could be to put and extension a restrictive toll restriction class or block a number from being dialled.

Say for example an alert is configured that provides a warning if 50 outbound calls are made in a 60 minute period and blocks if 100 calls are made in the same time period. When the 50 call limit is reached by an extension, an email will be sent informing the configured users. If the user replies to the email then the extension will be moved to a restrictive toll restriction class to prevent it from being able to dial out. When the 100 call limit is reached, if the user had not replied to the first email then the extension would be automatically blocked from dialling out. When this happens, an email is generated saying that the number has been blocked. The user can reply to the email to un-block the action. A similar concept exists to block an actual number from being dialled rather than an extension making a high number of calls. This would mean if any extension made calls to the same number, the number could be added to a restrict table. Further details of the rules and what they do is available in the End User Guide.

For Inbound calls the Guard will monitor the system for suspicious call patterns and send an email to warn the user. As such there are no blocking actions that can be carried out for incoming calls, the Guard just inform the user about the suspicious behaviour.

The Guard requires access to an email server that is enabled for SMTP and POP3, these are used for email integration to the application, SSL/TLS and unencrypted connections can be used. The application is accessed using a Web Browser, both Internet Explorer version 11 and Firefox 37 can be used to configure the Guard.

This manual explains how to install and configure and Toll Fraud Guard application.

PBX Requirements

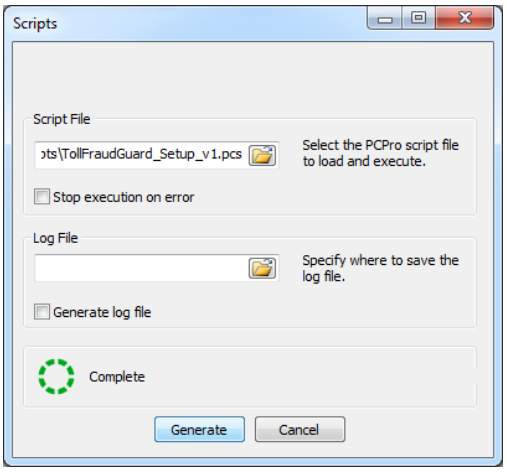
The Toll Fraud Guard Application runs on the CPU of the PBX using its Lua engine. A version of system software that contains the Lua engine will need to be running on the PBX, the versions of system software are as follows:

PBX	System Software Version
SV9100	2.00.60 / 3.00.51
SV8100	9.54 / 9.55
SL1100	5.11 / 5.12

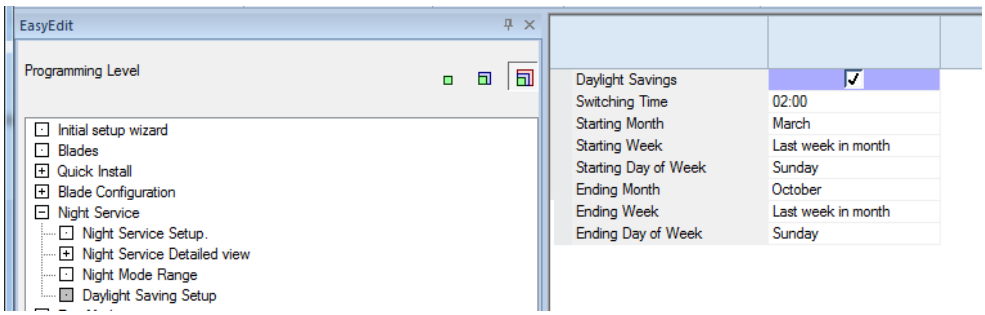
On the SV8100 and SL1x00 an ME50 card has to be installed on the CPU to run any Lua applications.

PBX Configuration

The Toll Fraud Guard Application uses the SMDR output from the PBX to gather details about calls that are made. SMDR output has to be enabled in a particular format that the application will recognise. There is a PC Pro script that can be run to configure the SMDR into the right format and enable the output for all extensions and trunks. The Script is called "TollFraudGuard_Setup_V1.pcs". In effect the script will enable SMDR Output over TCP Port 4001 for all extensions and trunks.



In order for the Guard application to be aware of the correct time, the Daylight Saving feature has to be enabled, this is in PC Pro > Easy Edit > Night Service > Daylight Saving Setup or PRG command 10-24.



Licensing

The Guard Application requires a license in order to run, the license is a normal system license that is installed on the PBX. The application can be run when the 60 day license is active on the system.

PBX	Part Number	4 Digit Feature Code(s)
SV9100	EU000285	3512, 0041
SV8100	EU000271	3512, 0041, 0008
SL1x00	EU000270	3512, 0041

As the Guard uses SMDR output to work, when you are running the application on an SV8100, you will need an SMDR license. This is included when you purchase the license for the Toll Fraud Guard. On the SL1x00 and SV9100, SMDR output is not licensed and therefore you only require the license to run the application.

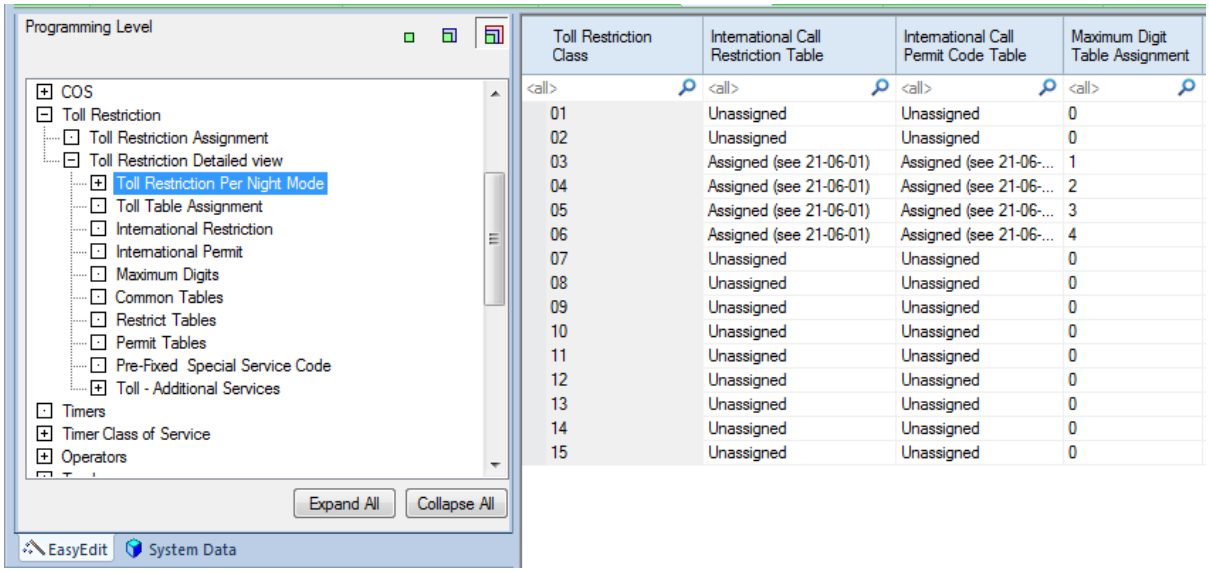
The 3512 code can only be displayed in PC Pro, so if you want to check to see what licenses are installed then look in PC Pro. TelPRO and WebPRO do not show license code 3512.

Toll Restriction on the PBX

Toll Restriction should be enabled as normal on the PBX, on top of that for the Guard to be effective, some areas of Toll Restriction have to be set aside for it to use. In terms of actions that the guard can carry out, firstly it can move extensions to a predetermined Toll Restriction Class. This Toll Restriction Calls should be completely restricted from making any outbound calls apart from calls to emergency telephone numbers. The second action the guard can carry out is to block certain numbers from being dialled by putting it in a Restrict Table. A dedicated Toll Restriction Table should be assigned elected as one that the guard application will use.

Configure a Restricted Toll Restriction Class

In PC Pro you will need to switch to Easy Edit Mode and be in programming level 3. In there you will find the Toll Restriction area, alternatively this can be configured in PRG commands 21-xx.

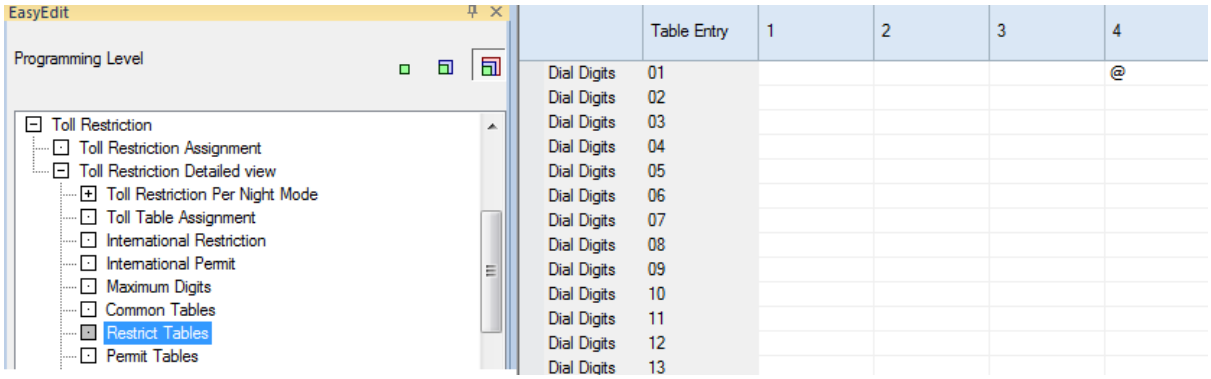


Open the page in Easy Edit > Toll Restriction > Toll Detailed View > Toll Table Assignment. Choose an unused Toll Restriction Class that the Guard will use and set the following data.

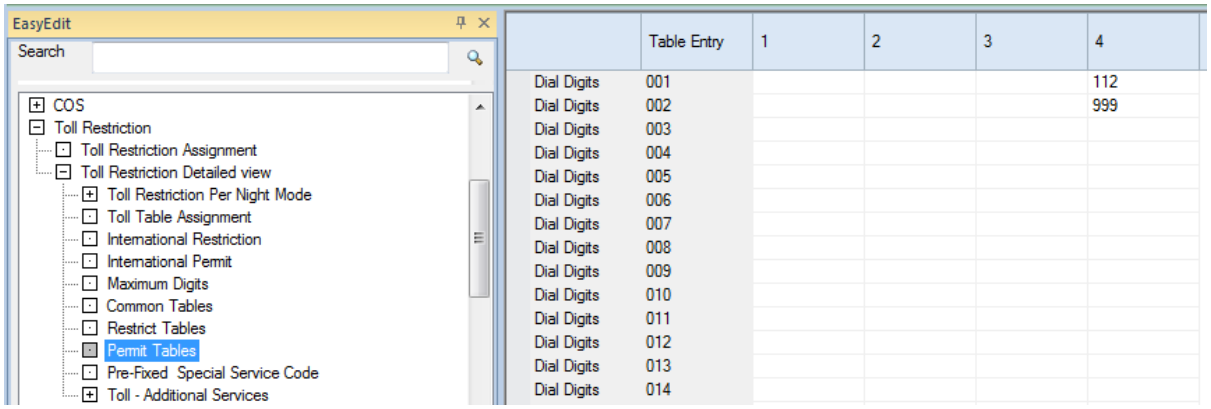
Setting	Value
International Call Restriction Table	Unassigned
International Call Permit Table	Unassigned
Maximum Digit Table Assignment	0
Common Permit Code Table	Unassigned
Common Restriction Table	Unassigned
Permit Code Table	4
Restriction Table	4
Speed Dial Common Restriction	Enabled
Speed Group Dial Restriction	Enabled
Internal Call Restriction	Disabled
PBX Call Restriction	Disabled
TIE Call Restriction	Enabled

This effectively means that the Toll Restriction Class will be permitted to dial any number assigned in Permit Table 4 and will not be able to dial any numbers in Restriction Table 4.

In Toll Restriction > Toll Restriction Detailed View > Restrict Table, enter @ against table 4. This is effectively treated as a wild card meaning no digits can be dialled. The only override for this rule would be any numbers entered in the Permit Table.



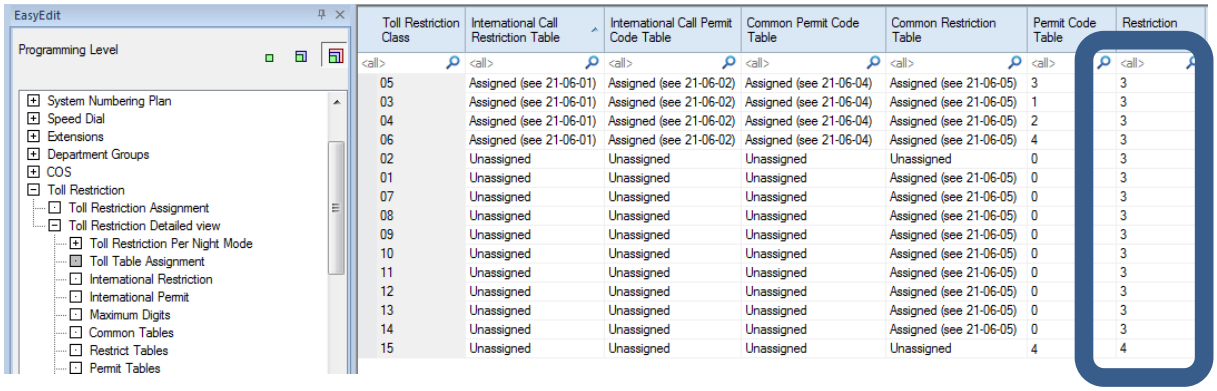
In Toll Restriction > Toll Restriction Detailed View > Permit Table, enter any emergency numbers that may need to be dialled. This will allow an extension that has been put into the Toll Restriction Class that the Guard will use will always be able to make emergency calls.



Once these changed have been applied to the PBX then they should be tested to confirm they are working as expected. To do this, manually assign an extension to the Toll Restriction Class that the Guard will use and try to make some outbound calls to any destination number. If you use different Day and Night modes on the PBX then its good practice to check Toll Restriction in each different mode that is used. Once you have confirmed the Toll Restriction is working correctly then move the extension back to its previous class.

Configure an Area to Restrict Dialled Numbers

Open the page in Easy Edit > Toll Restriction > Toll Detailed View > Toll Table Assignment. Assign a Restriction Table to all Toll Restriction Classes apart from the one assigned to the Restrictive Toll Restriction Class. This will prevent any numbers in the restriction table from being dialled, the example below shows Restriction Table 3 being used for Classes 1-14.



Toll Restriction Class	International Call Restriction Table	International Call Permit Code Table	Common Permit Code Table	Common Restriction Table	Permit Code Table	Restriction
<all>	<all>	<all>	<all>	<all>	<all>	<all>
05	Assigned (see 21-06-01)	Assigned (see 21-06-02)	Assigned (see 21-06-04)	Assigned (see 21-06-05)	3	3
03	Assigned (see 21-06-01)	Assigned (see 21-06-02)	Assigned (see 21-06-04)	Assigned (see 21-06-05)	1	3
04	Assigned (see 21-06-01)	Assigned (see 21-06-02)	Assigned (see 21-06-04)	Assigned (see 21-06-05)	2	3
06	Assigned (see 21-06-01)	Assigned (see 21-06-02)	Assigned (see 21-06-04)	Assigned (see 21-06-05)	4	3
02	Unassigned	Unassigned	Unassigned	Unassigned	0	3
01	Unassigned	Unassigned	Unassigned	Assigned (see 21-06-05)	0	3
07	Unassigned	Unassigned	Unassigned	Assigned (see 21-06-05)	0	3
08	Unassigned	Unassigned	Unassigned	Assigned (see 21-06-05)	0	3
09	Unassigned	Unassigned	Unassigned	Assigned (see 21-06-05)	0	3
10	Unassigned	Unassigned	Unassigned	Assigned (see 21-06-05)	0	3
11	Unassigned	Unassigned	Unassigned	Assigned (see 21-06-05)	0	3
12	Unassigned	Unassigned	Unassigned	Assigned (see 21-06-05)	0	3
13	Unassigned	Unassigned	Unassigned	Assigned (see 21-06-05)	0	3
14	Unassigned	Unassigned	Unassigned	Assigned (see 21-06-05)	0	3
15	Unassigned	Unassigned	Unassigned	Unassigned	4	4

To test that the Restriction Table is working, you can manually enter a number in the Restrict Table and try is call it.

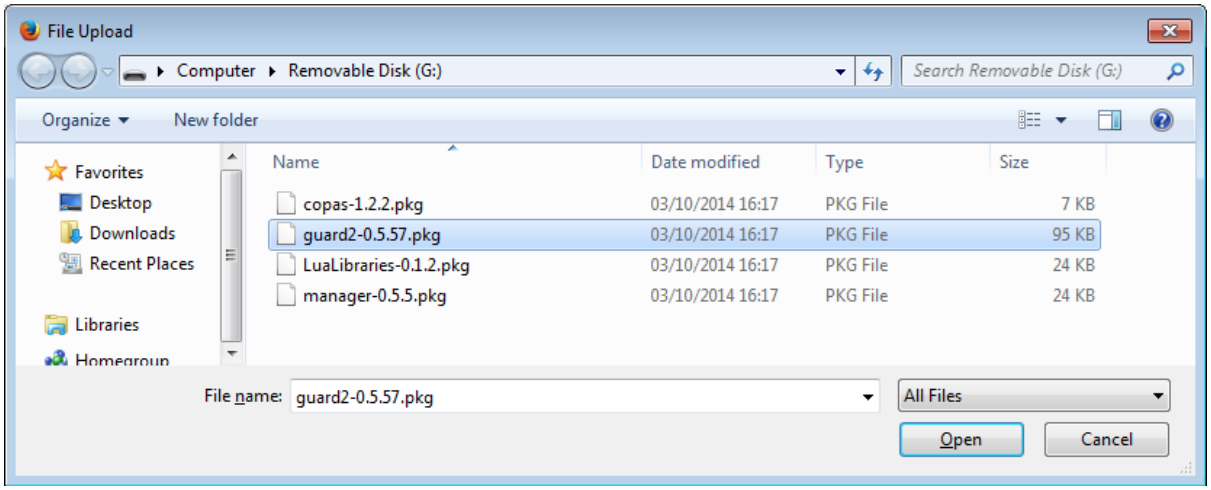
Installing the Guard Application

The Guard Application is installed using the Application Manager page, from the home page click the Install button in the upper right hand side of the page. This is available from:

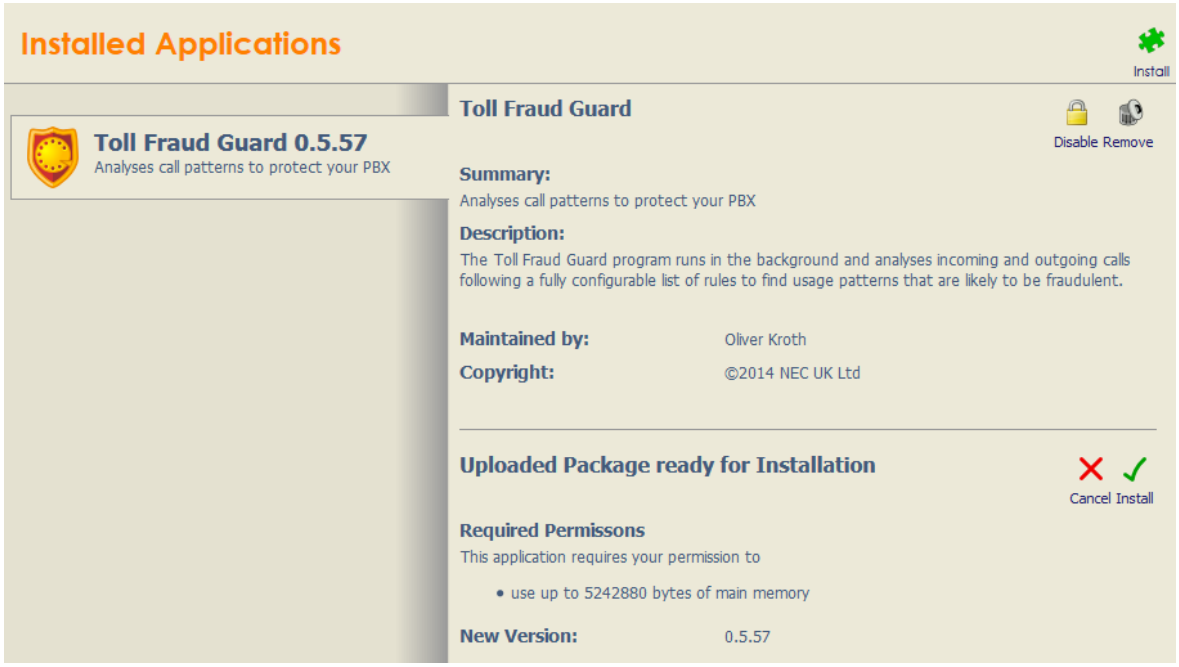
http://IP Address of the PBX/html/apps/manager.cgi

You need to enter a username and password from command 90-02 to access the application manager.

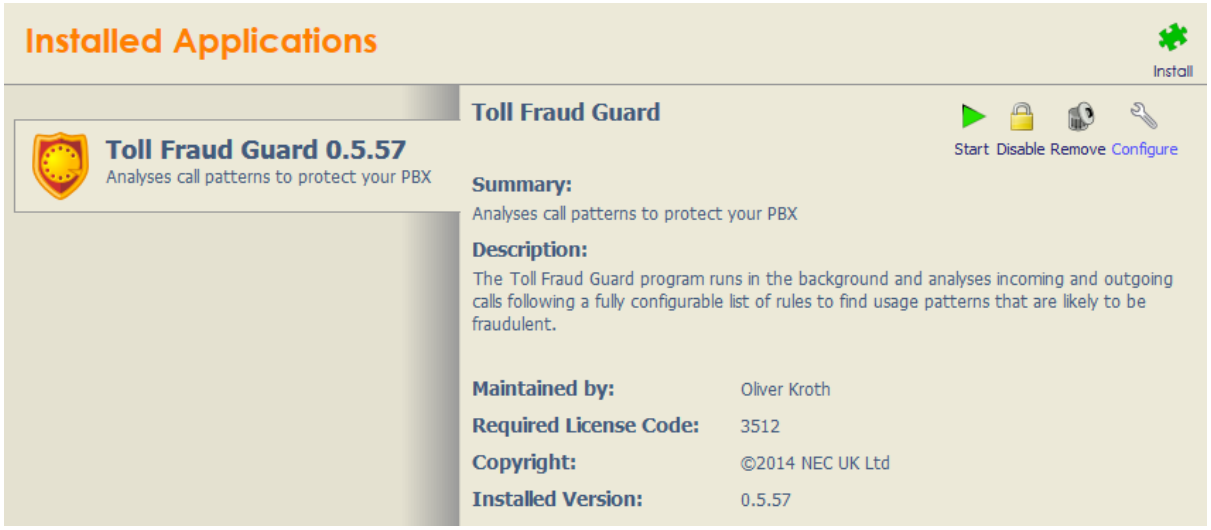
Browse to the guard installation file and click OK.



Click the Install button in the lower right hand corner to install the application.


Installed Applications
Install
Toll Fraud Guard 0.5.57
Analyses call patterns to protect your PBX
Toll Fraud Guard
Disable Remove
Summary:
Analyses call patterns to protect your PBX
Description:
The Toll Fraud Guard program runs in the background and analyses incoming and outgoing calls following a fully configurable list of rules to find usage patterns that are likely to be fraudulent.
Maintained by: Oliver Kroth
Copyright: ©2014 NEC UK Ltd
Uploaded Package ready for Installation
Cancel Install
Required Permissons
This application requires your permission to
• use up to 5242880 bytes of main memory
New Version: 0.5.57

Once the application is installed, the options to Start, Disable, Remove and Configure are available.

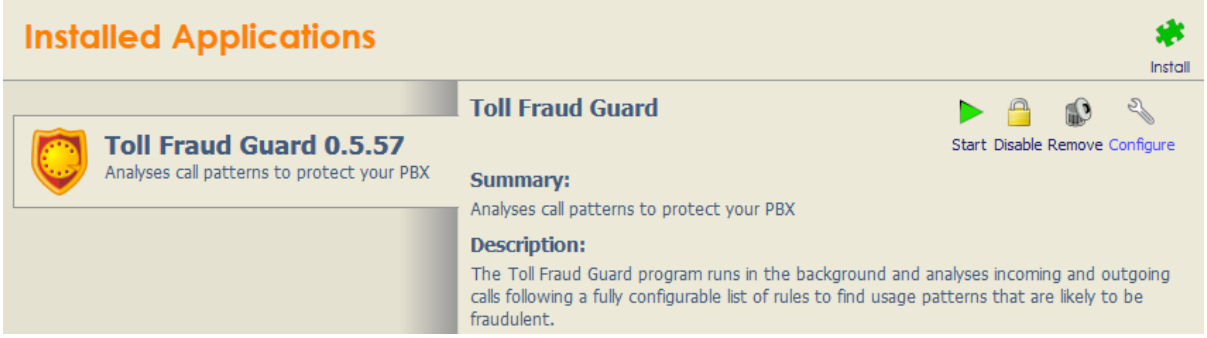

Installed Applications
Install
Toll Fraud Guard 0.5.57
Analyses call patterns to protect your PBX
Toll Fraud Guard
Start Disable Remove Configure
Summary:
Analyses call patterns to protect your PBX
Description:
The Toll Fraud Guard program runs in the background and analyses incoming and outgoing calls following a fully configurable list of rules to find usage patterns that are likely to be fraudulent.
Maintained by: Oliver Kroth
Required License Code: 3512
Copyright: ©2014 NEC UK Ltd
Installed Version: 0.5.57

When the guard is configured and starts, it will start gathering data and apply and rules that are configured. Before starting the Guard for the first time, it has to be configured first. If you start it before configuring it the Guard will stop.

Each time the start is stopped and started, it will start gathering data from scratch. The guard doesn't hold historic call information. When the PBX is restarted the Guard will automatically start unless is has been disabled.

Configuring the Toll Fraud Guard

Click the Configure button on the right hand side to begin setting up the guard application.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Toll Fraud Guard
Start Disable Remove Configure
Summary:
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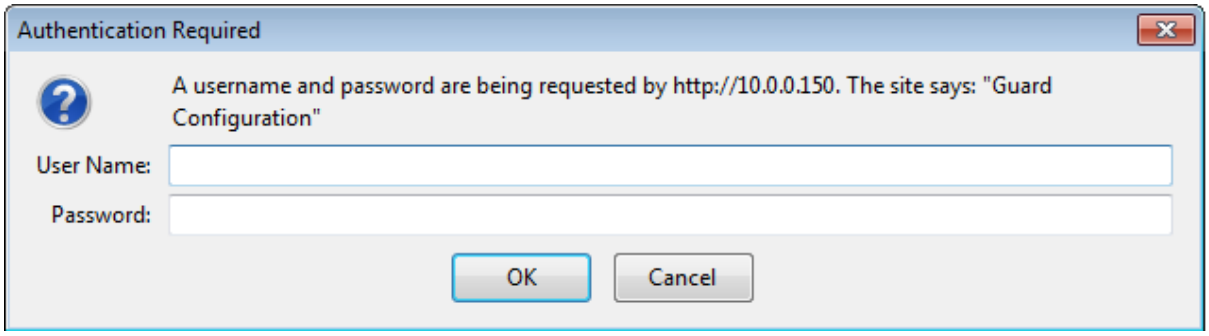
The Toll Fraud Guard program runs in the background and analyses incoming and outgoing calls following a fully configurable list of rules to find usage patterns that are likely to be fraudulent.

You will be prompted to enter a username and password to access the configuration. The default username and password is:

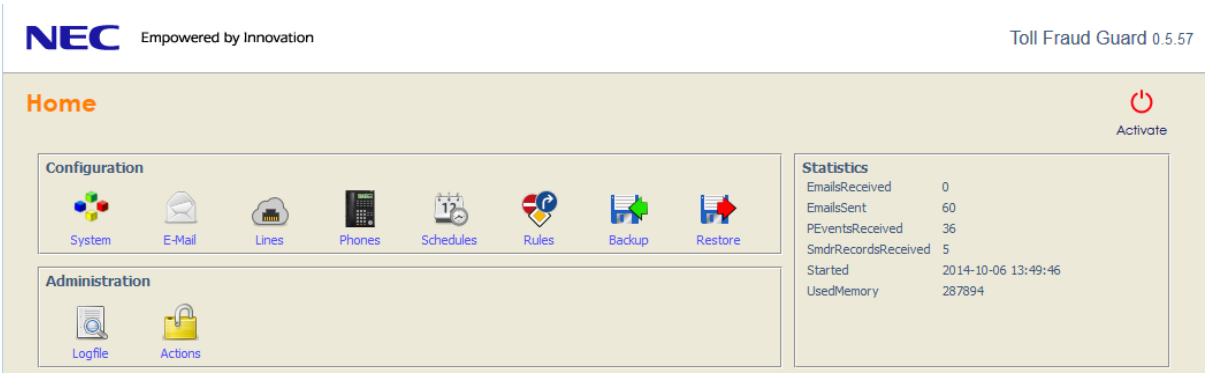
Username: tech

Password: 12345678



Enter the username and password then click OK.

Once you have logged in, you will see the configuration home screen. From here you can configure all the different options that are available in the guard.

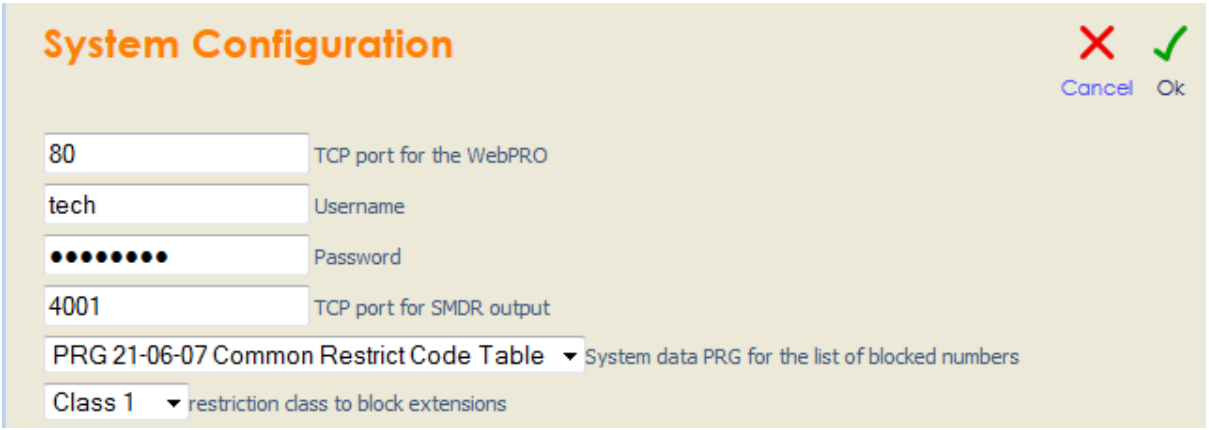


System

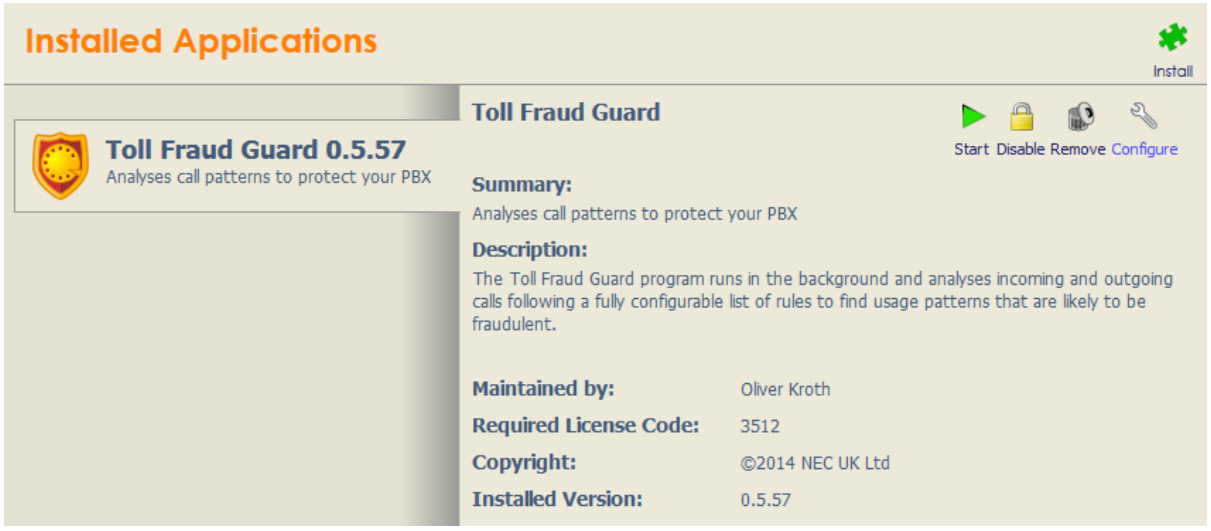
The system menu is used to define information used by the guard to integrate to the PBX.

Setting	Value
TCP Port for WebPRO	Enter the TCP Port that WebPRO uses, the default value is 80. The WebPRO TCP Port is set in PRG command 90-54.
Username	Enter a username that matches an entry in PRG command 90-02, the user level must be Installer Level.
Password	Enter the password for the above username.
TCP port for SMDR Output	Enter the TCP Port for the SMDR output, the Script sets this to 4001 by default.
System Data PRG for the list of blocked numbers	This is the area where the guard will enter numbers that are blocked from dialling. This should have already been created and defined in the PBX's Toll Restriction configuration.
Restriction Class to Block Extensions	This is the Toll Restriction Class that has been created for the Guard to use. It should only be allowed to dial emergency telephone numbers.

Enter the system configuration parameters and click OK to save the changes. If the user and passwords have been changed then the next time you logon to the application, you will need to use these credentials.



Once the System Configuration page has been configured then the application can be started. To do this return to the Application Manager and click the Start button.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Maintained by: Oliver Kroth
Required License Code: 3512
Copyright: ©2014 NEC UK Ltd
Installed Version: 0.5.57

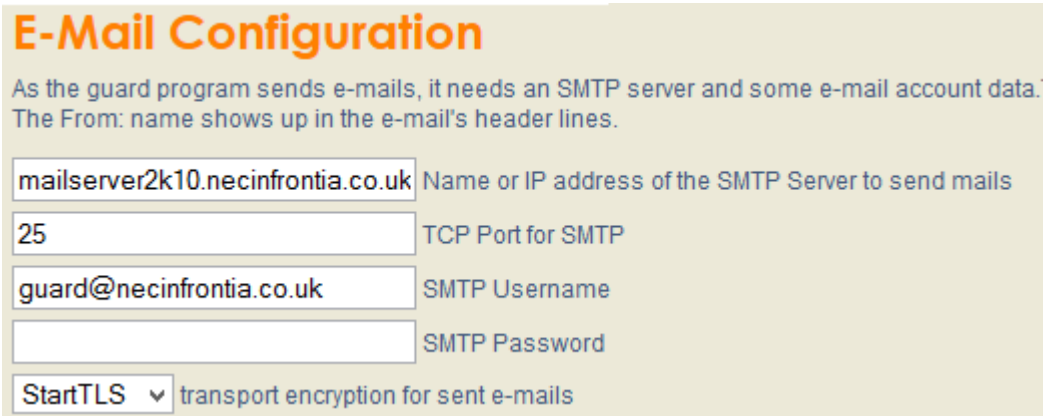
The guard will take a few moments to start, when it has started the Start button changes to a stop button.

Installed Applications
Install
Toll Fraud Guard 0.5.57
Analyses call patterns to protect your PBX
Toll Fraud Guard
Stop Configure
Summary:
Analyses call patterns to protect your PBX
Description:
The Toll Fraud Guard program runs in the background and analyses incoming and outgoing calls following a fully configurable list of rules to find usage patterns that are likely to be fraudulent.

Once the Guard is started, you can click the Configure button to return to the Guards home page.

Email Configuration

The Guard uses emails to inform users when Toll Fraud rules have been broken. Emails that the Guard sends are sent using SMTP, typically the administrator of the mail server will assign an email address that will be used by the Guard. The username will be the username of the SMTP user account. If the mail server is using Authentication mode then an SMTP Password will need to be entered. If Authentication mode isn't being used then do not enter a password. Encryption is not supported for SMTP or POP3 so these need to be disabled on the email that the guard uses.


E-Mail Configuration
As the guard program sends e-mails, it needs an SMTP server and some e-mail account data.
The From: name shows up in the e-mail's header lines.
mailserver2k10.necinfrontia.co.uk
Name or IP address of the SMTP Server to send mails
25
TCP Port for SMTP
guard@necinfrontia.co.uk
SMTP Username
SMTP Password
StartTLS
transport encryption for sent e-mails

Note! The SMTP Username is used in the SMTP protocol as the sender, this is usually entered in a format containing the domain name.

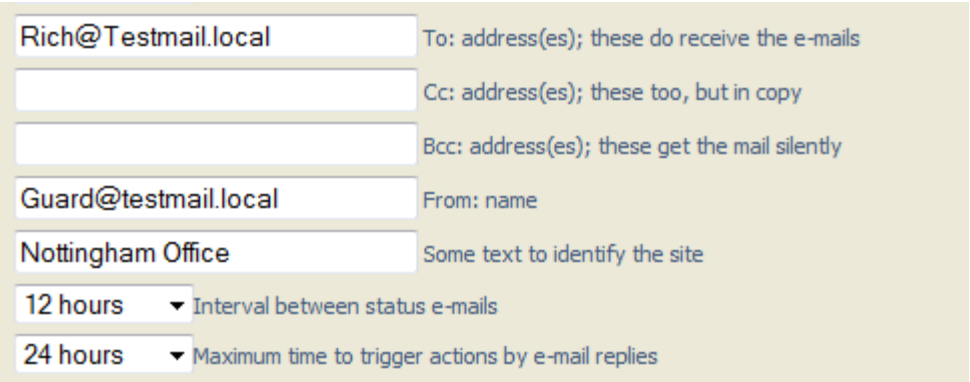
If the mailserver is entered as a hostname, then DNS must be entered in PRG command 10-12-13.

Setting	Value
Name or IP Address of the SMTP Server to send mails	Enter the IP address or hostname of the mail server.
TCP Port for SMTP	Enter the TCP port for SMTP mail server.
SMTP Username	Enter the username for the SMTP account.
SMTP Password	If required enter a password.
Transport Encryption for sent emails	Select the encryption type that will be used for sending emails.

The next part of the configuration is used for the POP3 functionality, this is used by the Guard to look for replies to email messages. The administrator of the mail server will typically need to create an account that is enabled for POP3. The guard will logon to the configured POP3 account with the supplied username and password to check for new emails.

Setting	Value
Name or IP Address of the POP3 Server to collect mails	Enter the IP address of the POP3 mailserver.
TCP Port for POP3	Enter the TCP port for SMTP
POP3 Username	Enter a username
POP3 Password	Enter a password
Transport Encryption for received emails	Select the encryption type that
Period to look for new emails	Select the encryption type that will be used for receiving emails.

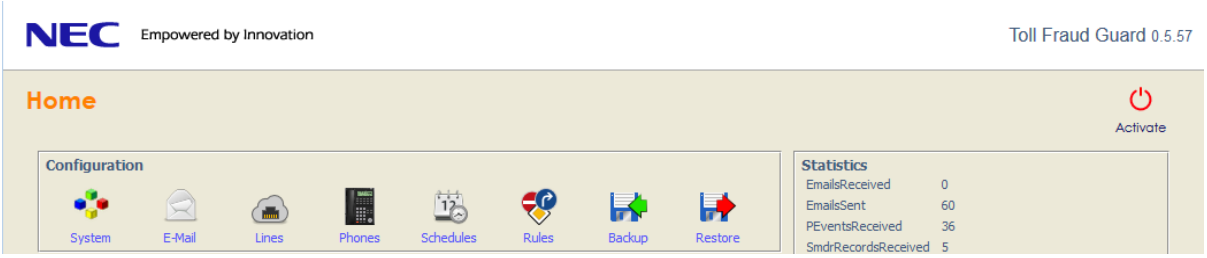
The final part of the email configuration defines the rest of the mail settings and some miscellaneous items.


Rich@Testmail.local
To: address(es); these do receive the e-mails
Cc: address(es); these too, but in copy
Bcc: address(es); these get the mail silently
Guard@testmail.local
From: name
Nottingham Office
Some text to identify the site
12 hours
Interval between status e-mails
24 hours
Maximum time to trigger actions by e-mail replies

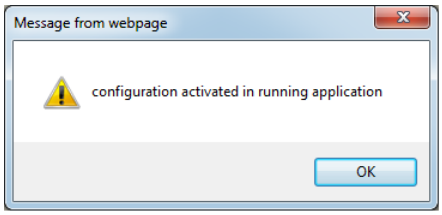
Configure the settings as required.

Setting	Value
To: Address	Enter the email addresses that will receive the emails. Use ; to separate multiple email addresses.
Cc: Address	Carbon Copy Email addresses can be entered here.
Bcc: Address	Blind Carbon Copy Email addresses can be entered here.
From:	This will be who the email is sent from.
Some Text to Identify the site	Enter a name to Identify the site, this text is included in the email subject and main body.
Internal between status emails	The Guard will send an 'On Duty' email at set intervals to inform the user that it is still running. Set the interval in the drop down menu.
Maximum time to trigger actions by email replies	When an email is generated it will be valid for a period of time, set the duration that the email will be valid for in here.

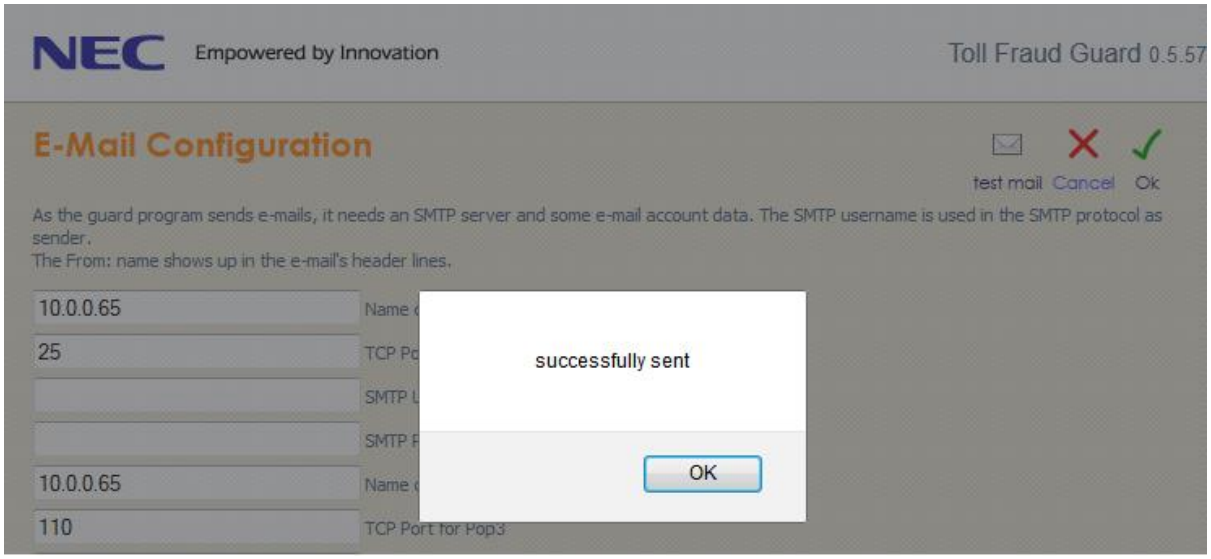
When all the settings are entered, the SMTP settings can be validated by clicking the Test Mail icon. Before clicking the test mail button, you first have to click the OK button and then click the Activate button in the Guards home page.



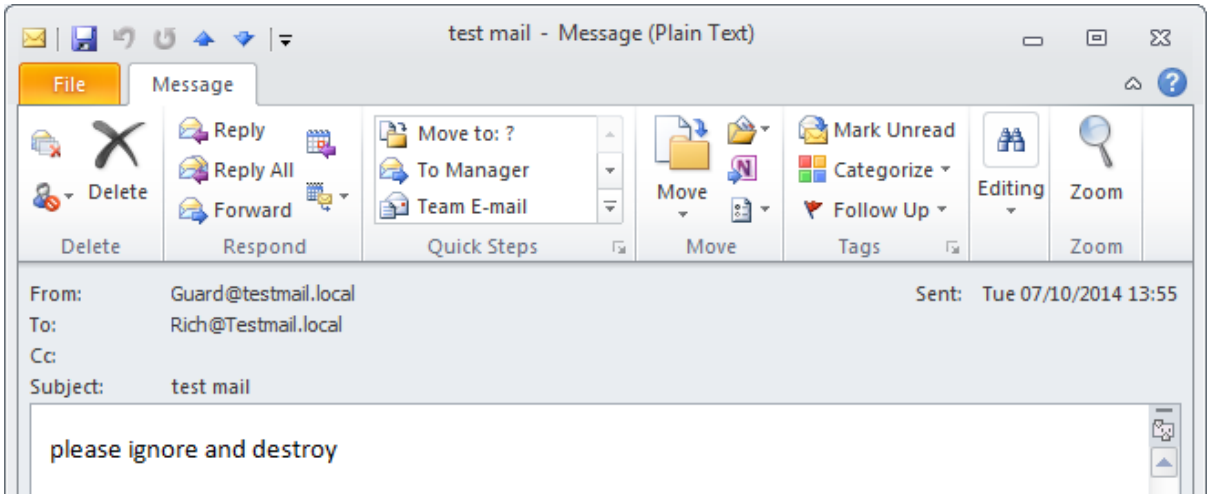
A confirmation message is displayed when the configuration has been successfully activated.



Return to the Email configuration page and click and click the Test Mail button and the Guard will attempt to send an email using the configured details, a message will be displayed saying if the test was successful or not. The test doesn't perform a test on the POP3 settings.



The test email looks like this.

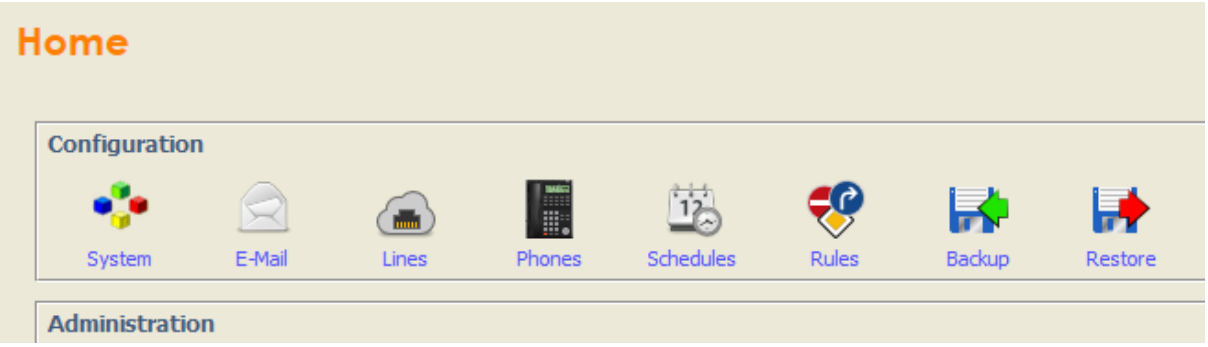


After performing the test, click OK to save the changes and from the home page, click the Activation button to save the changes to the Email configuration.

For Information on using the Guard application, refer to the separate User Guide.

Backup and Restore

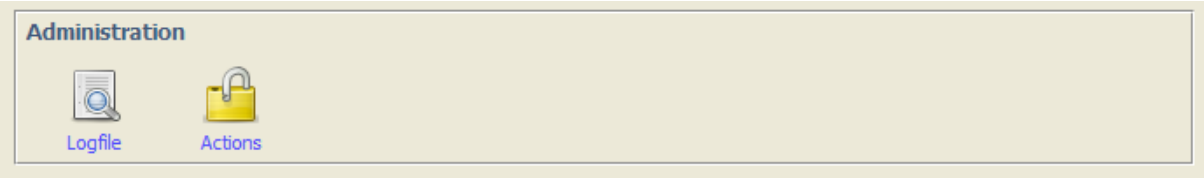
The Guard's configuration is can be backed up to a file, this is particularly useful if you are intending on making some changes to the configuration and wanted to be able to roll them back.



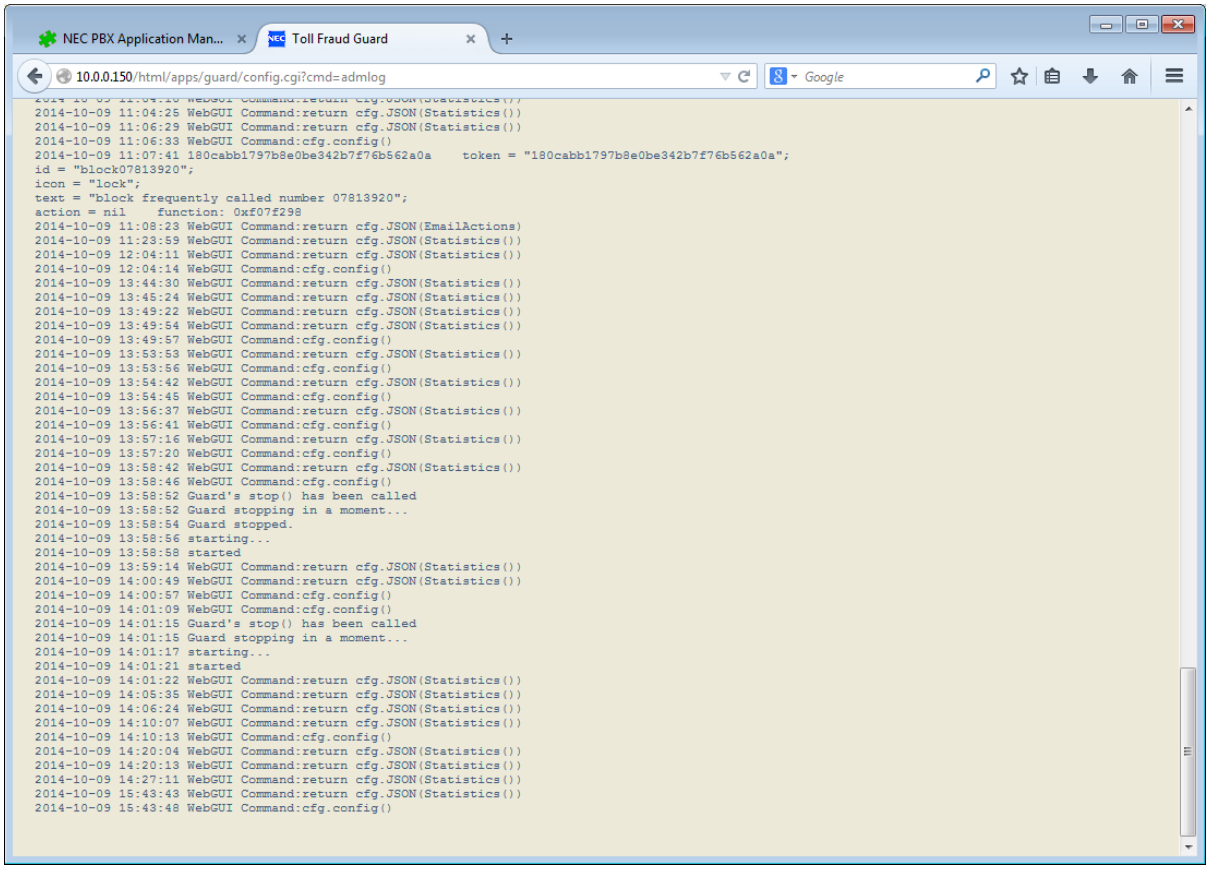
From the Guard home page, click the Backup button and follow the prompts to save the file. The file will be date and time stamped. To carry out a restore from a file, click the Restore button and browse to the backup file.

Log Files

Under Administration menu, there is an option to look at log files.



This keeps a log of when the guard started / stopped and carried out and blocking actions.

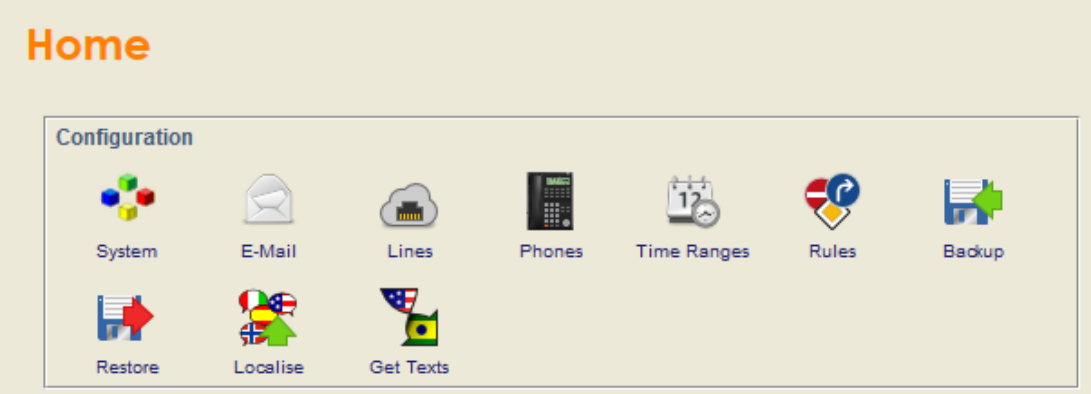

NEC PBX Application Man...
Toll Fraud Guard
10.0.0.150/html/apps/guard/config.cgi?cmd=admlog
Google
2014-10-09 11:04:25 WebGUI Command:return cfg.JSON(Statistics())
2014-10-09 11:06:29 WebGUI Command:return cfg.JSON(Statistics())
2014-10-09 11:06:33 WebGUI Command:cfg.config()
2014-10-09 11:07:41 180cabb1797b8e0be342b7f76b562a0a token = "180cabb1797b8e0be342b7f76b562a0a";
id = "block07813920";
icon = "lock";
text = "block frequently called number 07813920";
action = nil function: 0xf07f298
2014-10-09 11:08:23 WebGUI Command:return cfg.JSON(EmailActions)
2014-10-09 11:23:59 WebGUI Command:return cfg.JSON(Statistics())
2014-10-09 12:04:11 WebGUI Command:return cfg.JSON(Statistics())
2014-10-09 12:04:14 WebGUI Command:cfg.config()
2014-10-09 13:44:30 WebGUI Command:return cfg.JSON(Statistics())
2014-10-09 13:45:24 WebGUI Command:return cfg.JSON(Statistics())
2014-10-09 13:49:22 WebGUI Command:return cfg.JSON(Statistics())
2014-10-09 13:49:54 WebGUI Command:return cfg.JSON(Statistics())
2014-10-09 13:49:57 WebGUI Command:cfg.config()
2014-10-09 13:53:53 WebGUI Command:return cfg.JSON(Statistics())
2014-10-09 13:53:56 WebGUI Command:cfg.config()
2014-10-09 13:54:42 WebGUI Command:return cfg.JSON(Statistics())
2014-10-09 13:54:45 WebGUI Command:cfg.config()
2014-10-09 13:56:37 WebGUI Command:return cfg.JSON(Statistics())
2014-10-09 13:56:41 WebGUI Command:cfg.config()
2014-10-09 13:57:16 WebGUI Command:return cfg.JSON(Statistics())
2014-10-09 13:57:20 WebGUI Command:cfg.config()
2014-10-09 13:58:42 WebGUI Command:return cfg.JSON(Statistics())
2014-10-09 13:58:46 WebGUI Command:cfg.config()
2014-10-09 13:58:52 Guard's stop() has been called
2014-10-09 13:58:52 Guard stopping in a moment...
2014-10-09 13:58:54 Guard stopped.
2014-10-09 13:58:56 starting...
2014-10-09 13:58:58 started
2014-10-09 13:59:14 WebGUI Command:return cfg.JSON(Statistics())
2014-10-09 14:00:49 WebGUI Command:return cfg.JSON(Statistics())
2014-10-09 14:00:57 WebGUI Command:cfg.config()
2014-10-09 14:01:09 WebGUI Command:cfg.config()
2014-10-09 14:01:15 Guard's stop() has been called
2014-10-09 14:01:15 Guard stopping in a moment...
2014-10-09 14:01:17 starting...
2014-10-09 14:01:21 started
2014-10-09 14:01:22 WebGUI Command:return cfg.JSON(Statistics())
2014-10-09 14:05:35 WebGUI Command:return cfg.JSON(Statistics())
2014-10-09 14:06:24 WebGUI Command:return cfg.JSON(Statistics())
2014-10-09 14:10:07 WebGUI Command:return cfg.JSON(Statistics())
2014-10-09 14:10:13 WebGUI Command:cfg.config()
2014-10-09 14:20:04 WebGUI Command:return cfg.JSON(Statistics())
2014-10-09 14:20:13 WebGUI Command:return cfg.JSON(Statistics())
2014-10-09 14:27:11 WebGUI Command:return cfg.JSON(Statistics())
2014-10-09 15:43:43 WebGUI Command:return cfg.JSON(Statistics())
2014-10-09 15:43:48 WebGUI Command:cfg.config()

Translating the Guard Application

The guard application can be translated, making the application available to a variety of users. There are three main steps to translating the application:

1. Export the t file from the application.
2. Edit the text file translating the appropriate text.
3. Import the translated file.

To begin, click the Get Texts Icon and save the file.



Open the file in a text editor and translate the test that appears between the double square brackets. Two open square brackets [[denote the start of a section for translation and two closed]] brackets the end. Any text between curly braces { } should not be translated. The picture below highlights in red boxes which text should be translated for the opening section.

```
-- PLEASE EDIT ONLY BETWEEN THE DOUBLE SQUARE BRACKETS [[ here ]]
--
-- note that there are {variable} parts in the texts:
-- {cdr.*} will be replaced by appropriate fields from the cdr (call detail record)
-- {cfg.*} takes values from the configuration
-- {rule.*} references the current applied rule
-- {params.*} delivers values from the currently active parameter set
--
-- DO NOT CHANGE ANYTHING BETWEEN THE {CURLY BRACES}
--

WarnExtensionCallRate =
[[
Rule "{rule.name}" found that the extension '{cdr.ext}' has made frequent
outgoing calls (at least {params.warn} in the last {params.wndw} seconds).

This is usually an indication for a fraud attempt.

If you consider this to be a fraud attempt,
reply to this email including this code: <#{replycode}#>,
and the extension will be blocked by setting it's restriction class to {cfg.DialBlockClass}

By sending this code: <#{replycode}#> to the guard (simply reply to this mail),
you can command the guard application to block the extension '{cdr.ext}', which is
done by setting it's restriction class to class #{cfg.DialBlockClass}
]];
```

Here is another example from further down the file:

```
148  Starting =
149  [[
150  The Toll Fraud Guard at {cfg.EmailSiteName} is on guard now.
151  Expect a report every {cfg.EmailReportInterval} seconds
152  ]];
153
154  Stopping =
155  [[
156  The Toll Fraud Guard at {cfg.EmailSiteName} has been shut down.
157  ]];
```

As the words Starting and Stopping fall outside of the square brackets, they should not be translated. Once the file is translated and saved, then click the Localise button in the guard application and browse to the translated file and click OK. The application will refresh and show the translations.

The get texts button can be used to re-export the currently used translation file.

If the Guard application is ever upgraded, then the application will default to use the English text again. When this happens, the translated file will have to be installed again.